S-Keeper 7™
MARINE APPROVED CEMS

GREEN EFFICIENCY ON BOARD
S-K7™ is a modular analysis system suitable for on-board continuous emissions monitoring as per:

- MARPOL Annex VI Reg. 13 & 14
- MEPC Circ. 471, 177(58), 184(59)
- IEC 60092-504

and certified as per:
- RINA Rules, Pt C, Ch 3, Sec 6
- LLOYD Register Test Spec 1
- DNV Standard for Certification 2.4

S-K7™ is simply the “State of the Art” of integrated analysis systems, fully compliant with applicable marine directives.

S-K7™ is fully tailored to the Shipowner’s requests with particular focus on CaPex & OpEx balance.

S-K7™ is integrated with a modern PEM Propulsion Efficiency Monitor, thus encompassing metered Fuel Consumption, Fuel Oil Viscosity, Thrust and Torque measuring Systems.

Thanks to the specific engineering of this modular system, the S-K7™ installation is able to withstand the toughest marine environment.

On-board maintenance is easy even for an unskilled operator, while the SPMP Spare Parts Management Program ensures the traceability of every single component and its availability on the ship’s course.

TECHNICAL DATA

S-K7™ OVERVIEW OF AVAILABLE FEATURES

- According to MARPOL Annex VI Reg.13 & MEPC 177(58), 184(59)
  - calculation of NOx g/kWh vs Tier I, Tier II, Tier III limits
  - monthly NOx compliance test report
- According to MARPOL Annex VI Reg.14 & MEPC 177(58), 184(59)
  - calculation SO2/CO2 ratio
  - calculation of Fuel Oil Sulphur content [% wt/wt] vs Reg.14 limits
- According to MEPC 177(58), 184(59) HC total Hydrocarbons load [ppm or g/kWh] is measured
- Reports according to ISO 14001 of totalized mass NOx / SOx / CO2 emissions [kg/tonne]
- Reports according to MEPC Circ. 471 of CO2 Emission Index [gCO2 / tonne n.m.]
- Combustion Efficiency monitoring by CO2/(CO2+CO) ratio
- Types EASY-N, LITE-N, LITE designed for LNG powered units
- O2 [%] & Particulate (mg/m3 or g/kWh) analysis as additional options
- Multiple stack management

S-K7™ MAIN SUPPLY

- Qty#1 Integrated Cabinet
- Qty#1 Sample probe & tube
- Qty#1 Sample line
- Qty#1 Bottles set [according to analyzed components]

S-K7™ ANALYTICAL OPTIONS

- Qty#1 Oxygen Analyser
- Qty#1 Particulate Analyzer
S-K7™ TECHNICAL SPECIFICATIONS

**ANALYZED COMPONENTS MEASURING METHOD**
- NOx, SO2, CO, CO2: NDIR (NO with NO2 to NO converter)
- HC: H-FID heated flame ionization detector

**AUXILIARY INPUTS**
Engine speed and Torque, Air inlet flow, Fuel flow, Ambient temperature, Pressure & Humidity sensors as per "NOX Technical Code 2008", Ship GPS Global Positioning System

**SOFTWARE**
- Windows®-based Emissions Reporting software
- Easy self-explaining graphical interface with Process Flow Diagram and real-time parameters
- Multilevel Password Protection and Data Encryption to ensure safest tamperproof procedure I/O

**CONNECTIONS**
1 x Ethernet RJ45, 1 x RS-485, 1 x SPDT contact

S-K7™ SAMPLING SYSTEM

**SAMPLE CONDITIONING SYSTEM**
According to "NOX Technical Code 2008" with system condition monitoring and maintenance indicators

**SAMPLE PROBE TECHNICAL SPECIFICATIONS**
- Operative Conditions: max. 200 kPa abs, 180°C
- Filter element: Bonded Silicon Carbide (CSi)
- Wetted parts: SS316Ti, CSi, Viton®
- Flanged Process Connection: DN 65 PN 6 DIN 2573
- Housing: SS304, IP43 rating

**SAMPLE LINE TECHNICAL SPECIFICATIONS**
- Operative Temperature 190°C/Max 210°C/Peak 250°C
- Maximum Operating Pressure 2.8 barg@200°C
- Wetted parts PTFE material
- External diameter 43 mm
- End Caps diameters 48 mm
- Minimum Allowable Bending Radius 200 mm
- External insulation Fiberglass

S-K7™ DIMENSIONS & WEIGHT

**MAIN INTEGRATED CABINET**
1050 x 1990 x 800 mm (WxHxD), 550 kg

**SAMPLE PROBE**
Housing 251 x 297 x 168 mm (WxHxD), 9 kg, Length TBD

**SAMPLE LINE**
Length TBD, 0.9 Kg/m

**CALIBRATION BOTTLE**
360 (H) x 90 mm (DN), 1.1 kg

**OXYGEN ANALYSER (OPTIONAL)**
Integrated in main cabinet

**PARTICULATE ANALYSER (OPTIONAL)**
Flanged housing 342 (L) x 74 mm (DN), 1.7 kg, Insertion length TBD

S-K7™ OXYGEN ANALYSER (OPTION)

**MEASUREMENT METHOD**
- Zirconium oxide

**MEASUREMENT RANGE**
- 0 + 25 % (dry)

**INSTALLATION**
- Integrated in main cabinet

S-K7™ PARTICULATE ANALYSER (OPTION)

**MEASUREMENT METHOD**
- Inductive Electrification

**MEASUREMENT RANGE**
- 0.3 μm or higher

**INSTALLATION**
- In-Situ, flanged to stack

S-K7™ AMBIENT CONDITIONS LIMITS

**MAIN INTEGRATED CABINET**
- Ambient Temperature +5 / +55°C; 95% RH Max

**SAMPLE PROBE**
- Ambient Temperature +5 / +55°C; 95% RH Max

**PARTICULATE ANALYSER (OPTION)**
- Ambient Temperature +5 / +55°C; 95% RH Max

S-K7™ UTILITIES CONSUMPTION

**POWER SUPPLY**
230 VAC @50/60 Hz

**MAXIMUM POWER CONSUMPTION (FULL MODEL)**
4.8 KVA Max

**CALIBRATION GAS BOTTLE / EACH PARAMETER**
1 bottle 110 L @ 20°C / 1 operative year approx

**DEMI WATER (ONLY LITE-S, LITE, FULL MODELS)**
1 canister of 5 Liters / 3 operative months approx

S-K7™ SELECTION TABLE

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<th>Type</th>
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<th>MEPC 777/184 (59)</th>
<th>Analyzed Components</th>
<th>Tier I/II/III Limits</th>
<th>MEPC Crr. 471</th>
<th>ISO 14001</th>
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LAYOUTS

MAIN INTEGRATED CABINET

RIGHT VIEW

FRONT VIEW

SAMPLE PROBE

PARTICULATE ANALYSER (OPTION)
S-K7™ companions

SLASHING EMISSIONS, REDUCING FUEL CONSUMPTION, MINIMIZING MAINTENANCE... IN OTHER WORDS, SUSTAINABLE SHIP EFFICIENCY. HOW? HERE’S OUR ANSWER.

POSITIVE DISPLACEMENT METERS

These liquid flow meters take accurate volumetric measurements for a wide range of liquids, from low-density LPG to fuel oil.

SHAFT POWER TORQUE & THRUST METER

Using the TT-Sense® for measuring thrust and torque results gives you an insight into your propeller efficiency, vessel pitch optimization, and hull resistance.

OIL DISCHARGE MONITORING EQUIPMENT

For the continuous on-line monitoring of discharge water during de-ballasting operations, the Oilcon® Mark 6 is a proven solution known worldwide.

TECNOVA HT solutions are in continuous development, so we reserve the right to make product changes without prior notice.

DS_SK_SK7_MARINE APPROVED CONTINUOUS EMISSIONS MONITORING SYSTEM_DRAFT